XXIV.—*A Contribution to the Study of South Indian Arachnology.* By W. RAE SHERRIFFS, M.A., D.Sc., formerly Professor of Zoology, Madras Christian College, Madras.

[Plates II.–VI.]

IN the preface to his volume on the 'Arachnida' (Fauna of British India Series) Mr. R. I. Pocock says "all that has been attempted is to afford means of identifying the larger, commoner, better known and more widely distributed forms . . . It is to be hoped that the present work, by facilitating the study of Indian spiders, will increase the number of observers and collectors, so that at some future time a far more complete account of these animals may become practicable."

These sentences were penned in 1900 and during the intervening years no contributions have been made to this subject, excepting quite recent papers by Dr. Gravely of the Indian Museum, Calcutta.

Thorell in his 'Catalogue of the Spiders of Burma' (written in Latin) and Pocock in his 'Arachnida' are purely descriptive, their aim being solely to enable their spiders to be identified. Simon in his vast work 'Histoire naturelle des Araignées' not only is systematic in his treatment, but also gives an account of the habits and customs of the different genera. As he deals with the spiders of the whole world, this part of the subject-matter is necessarily brief.

In the present paper the emphasis is not on the systematic side, for the writer has attempted, for the first time in South India, to enumerate the spiders commonly found throughout the hills and plains, regardless of size or any other consideration, definitely noting localities; also to describe their general life, habits and associations, the nature of the webs, their stabilimenta, and the cocoons with contained eggs.

With regard to the localities a few words of explanation are necessary. The spiders were collected during 1914–18 from three distinct regions—(1) the plains of South India represented by Madras city and the country around for 12 miles to the north (Ennur) and 35 miles to the south (Chinglepnt), (2) the hills, principally the Nilgiris, (3) central upcountry Ceylon. These three distinct regions differ widely in their rainfall, and therefore in the relative abundance of spiders throughout the year. Around Madras and the plains of the Carnatic the rainfall is about 50 inches per annum ; on the Nilgiris anything from 50–160 inches, while in the Dolosbage district of Ceylon it is 250 inches. The reason for the prolific rainfall in Ceylon is that it gets both the south-west and the north-east monsoons, while the Coromandel Coast of South India receives only the north-east which bursts at the middle of October and recurs at intervals till January. Throughout the greater part of the year Madras is dry—in 1911 the rainfall from 1st January to 30th June was half an inch—and spiders are not common. As soon as the first burst of the monsoon is past, then they appear in large numbers and the webs of the Argiopidæ are abundant.

On the Nilgiris the plateau gets both monsoons, the south-west bursting in full force against the western slopes, while the north-east, greatly diminished in strength, reaches the eastern slopes. Ootacamund, towards the centre of the plateau, receives a very little of the north-east but much more of the south-west. On the hills with the higher rainfall spiders are common all the year round. The high rainfall of Ceylon ensures a far greater abundance of spiders at all times than can ever be found in South India—excepting perhaps Cochin and Travancore, for there the vegetation is really tropical and insects are numerous.

In the few cases where I have drawn and painted spiders, I have done so in order to show the beautiful natural colours which, so often being changed or totally destroyed in spirit-specimens, have never been seen by the European authorities to whom collections have been sent from the East. Members of seventeen families have been discussed, but all the Mygalomorph spiders, the Thomisidæ and Salticidæ (Attidæ), though commonly represented, I have in the present paper deliberately omitted.

Madras,
October 24, 1918.

Uloboridæ.

Uloborus (Latr.), 1806.

1. *Uloborus geniculatus* (Oliv.).

This pretty grey and white spider is cosmopolitan in the Tropics, according to Simon, who has recorded it from Ceylon. McCook figured the web, *cf.* 'American Spiders' (i. figs. 56, 57, 163), and the cocoon is accurately described by Simon, vol. i. page 213. The web is not laid horizontally, but almost vertically. The cocoon s about 7 mm. at greatest width, has from 6–10 lobes, and contains from 14–50 eggs. Thorell's account of the cocoon is incorrect as regards colour (page 127). Gravely in the 'Records of the Indian Museum,' xi. pages 533, 534, has noted the association of Uloborids with *Stegodyphus sarasinorum*, *Psechrus alticeps*, *Cyrtophora cicatrosa*, and *Gasteracantha brevispina*. I have seen *U. geniculatus* associated with *Nephila malabarensis*. The spider is not a common one, and is never found in large numbers. I have usually got it within outhouses.

Locality. Nawalapitiya, Ceylon (February), 3000 feet; Kayencolam, Travancore (July); Elliot's Beach, Madras (August); High Court compound, Madras (February); Hillgrove, Nilgiris (May), 4200 feet; Eunur (September). As I have found the cocoons present on each of these occasions, these must be made regularly throughout the year. The spider is thus widespread over South India, both on the plains and also on the hills. Not previously reported from South India.

Psechridæ.

PSECHRUS (Thorell), 1878.

2. *Psechrus torvus* (O. P.-Camb.) (Pl. II. figs. 1, 2)

comes out in the evenings and is nocturnal. Its web is large, of a very dense white, often projecting from under a stone on the banks of the roadsides, and ends in a tubular retreat within which the brown spider lurks inverted. The web is not a true dome, *cf.* 'Cambridge Natural History,' iv. page 399, nor is it sheet-like, *cf.* Pocock, page 210. Pocock's figure, page 211, should be inverted, because the spider always moves inverted below its web. The calamistrum is very short.

P. torvus is very difficult to secure whole because of its very irregular and rapid movements on its web, *cf.* Simon, i. page 225. The dense white web which is sometimes quite big, as much as 2 feet at greatest length, is rivalled in its snowy whiteness by the smaller but similarly shaped web of the little *Ischnothele dumicola* (Poc.), a Diplеurid reported from Poona by Wroughton. Both *P. torvus* and *I. dumicola* occur together on the road-banks of the upcountry tea estates round Nawalapitiya, Ceylon. The web of *Ischnothele* is much smaller than that of *Psechrus*, and differs from it in that the tubular retreat spreads out to form the snare as an expanded sheet, upon which the spider moves after its victim.

Locality. Nawalapitiya, Ceylon (February–May), 3000 feet. *P. torvus* (O. P.-C.) belongs to Ceylon; *P. argentatus* (Dol.) is Malayan, while *P. alticeps* (Poc.) is reported by Gravely from Cochin.

Œcobiidæ.

Œcobius (Luc.), 1845.

3. *Œcobius* sp.?

Quite recently, while on the hills, I found several spiders belonging to this group (family), which has only the single genus *Œcobius.* These of both sexes were taken while running actively on the outside wall of the house or from the corners of the inside walls of the bath-room. They are small spiders (2 mm. long) and prettily marked with black on a pale ground. The cephalothorax dorsally edged with black, the ocular area is blackish, while the abdomen dorsally is black in front and elsewhere spotted in black. In the species now mentioned the eyes are of the usual type characteristic of the family, but in arrangement they are intermediate between the *annulipes* and *concinnus* groups mentioned by Simon (i. page 247).

Locality. Coonoor, Nilgiris (April–May). Probably here first reported from India.

Eresidæ.

Stegodyphus (Sim.), 1873.

4. *Stegodyphus sarasinorum* (Karsch)

is the common social spider found throughout South India. Mr. N. S. Jambunathan thirteen years ago published an account of it in the 'Smithsonian Miscellaneous Collections.' This spider is found both in the plains and on the hills and always on bushes round the end branches where the colony is built. *Opuntia* on the plains and *Dodonea* and *Berberis* on the hills are often found bearing the web-masses, but the spider builds quite readily on the netting round tennis-courts. These web-masses are easily recognized yards away and are often several feet above the ground. Centrally the web-mass forms a spindle, about 6″ × 4″ at the widest part, which is well aerated by many holes. Many threads, which are strong and viscid, connect up this spindle to the neighbouring branches. Jambunathan gives 40–100 as the number of spiders found within one spindle. I have not found many above seventy. The web-mass has no definite architectural plan, and is very dirty and dusty and covered with the remains of victims, *cf.* flies, beetles, bugs, ants, grasshoppers, and dragonflies.

The male is almost as large as the female. Both sexes are very inert when captured, and lie quite still if touched. They work only during the darkness.

The web-mass or central spindle is the "large saccular nest" mentioned by Pocock. Many cocoons are present within the spindle, each measuring 6 mm. in diameter, as Jambunathan has already noted. The cocoons are white, densely spun and irregularly circular in outline, disc-shaped, and of one piece, which bursts in the middle when the young emerge. The number of eggs enclosed varies from 30–50 almost. Gravely, in Rec. Ind. Mus. xi. plate 30, shows the nature of the web in detail.

S. sarasinorum is tending to become a pest of tea in the Nilgiris, because the web-mass is woven closely round the tips of the branches of the tea-bushes, preventing the buds from developing and the tender leaves, gathered for tea-making, from forming.

A planting friend who sent me the spiders had them named "Tea Mealy Bug." He later sent me two cuttings of branches with the web-masses representing spiders from three bushes, 165 spiders in all, 128 ♀, 36 ♂, and 57 cocoons. Jambunathan gives the proportion of the sexes as ♂ : ♀ : : 7 : 1, but my result yields ♂ : ♀ : : 1 : 3 roughly, with the ♀ much more numerous than the ♂, as they always are. In the case now cited, 2 acres out of a 9-acre block were affected at a level of 4000 feet, and as the tea-bushes were planted 2500 to the acre the number of spiders present must have been very great. Since the growth of the colonies is not rapid and the spiders can easily be removed by hand and destroyed, there does not seem any likelihood of the spider ever becoming a serious pest, unless sheer neglect allows *Stegodyphus* to get a firm hold. *Stegodyphus sarasinorum* is is the only spider I have met with as yet that can be considered of economic importance.

Locality. Madras city; Chingleput; Pamban (April), the desert, sandy region in the extreme south next Ceylon. Within Madras it is found throughout the year and so probably for the whole of South India. Kotagiri (6000 feet) and Hillgrove (4000 feet) on the Nilgiris (April–July); Ennur (September). At the end of September, while ascending the Nilgiri Mountain Railway, I saw from the train the web-masses of *S. sarasinorum* at Kolar Station

(1250 feet), near Adderley Station (2398 feet), and again near Hillgrove Station (3580 feet), but not above this level. These are the lower parts of the great Coonoor Ghaut.

5. *Stegodyphus socialis* (Poc.).

An allied species has been reported from Bangalore by Staunton. It is found on the *Casuarina* trees on Elliot's Beach, just south of Madras city.

Sicariidæ.

Representatives of the genera *Loxosceles* and *Scytodes* are both found in South India, but are not common.

LOXOSCELES (Lowe), 1831.

6. *Loxosceles erythrocephala* (C. L. Koch)

I have got as a house-spider, found at the bottom of a big glass vase within a cupboard. It was living on an irregular web covering the bottom of the vase and bearing remains of the victims.

7. *Loxosceles* sp. ?

A pair were found beneath a heavy box on the verandah among dust associating with Chelifers.

Loxosceles is not reported from the East by Simon, *cf.* i. p. 273, but by Thorell, *cf.* p. 68.

Locality. Madras city, all the year round within houses.

SCYTODES (Latr.), 1804.

8. *Scytodes gilva* (*Dictis gilva*), Thor.

Also met with as a house-spider, slender with long legs black at the joints. Web consists of a very irregular mass of threads. Both *Loxosceles* and *Scytodes* are nocturnal only.

Locality. Madras city within bungalows all the year round.

These genera are probably found only on the plains. I have seen none on the hills.

S. marmorata (C. L. Koch) and *S. pallida* (Dol.) are Malayan. The latter lives within curled up leaves after the manner of Clubionids and Theridiids, *cf.* Sim. i. p. 276. Such Theridiids and Clubionids are common here on the

Beach on the bushes there, but I have not yet found *Scytodes* living in this fashion. *S. univittata* (Sim.) is recorded from India.

Prodidomidæ.

ZIMIRIS (Sim.), 1882.

9. *Zimiris doriai*?

A very delicate, small, nocturnal spider, found always at night running on the walls of rooms within the bungalow. Entirely a house-spider and not at all common. Found often behind pictures on the walls, the web being just a few irregular threads on the back of the picture. Pair found together there, and as the male is said by Simon (i. p. 335) to be unknown, I give the following description:—

♂. 2 mm. long; colours very much as in ♀; legs yellow and smooth; abdomen all round in front furnished with short silvery hairs, which contrast with the grey colour of the abdomen itself. Spinnerets long and very much as in ♀; cephalothorax yellow-brown dorsally and quite smooth; palps robust and the palpal organ brown where the chitin is thick. As might be expected, the palpal organ greatly resembles that found in *Prodidomus*, cf. Simon, i. p. 335.

♂ caught running swiftly on the wall. When pursued it jumps like an Attid. When alive the colours are pale yellow, except the coxæ, which are clear and almost transparent; head and sternum clear; abdomen light grey; dark parts are the palpal organs, spinnerets, and feet, while the pair of front eyes are the darkest of all. Leg-span when at rest about 7 mm., almost twice this when extended.

Simon records only one species from India, but does not give its name. Presumably it is this one.

Locality. Madras city only, all the year round. Not obtained on the hills. Probably it is found throughout the plains.

Drassidæ.

Of this very large and difficult family I have met with only two members: *Drassodes lapidosus* (or one of that group) sent me from Palghat and *Leptodrassus* sp.? from within Madras city.

DRASSODES (Westr.), 1851.

10. *Drassodes lapidosus* (Walck.)

is taken by Simon as the type of his first group, *cf.* i. p. 359. My specimen agrees with the description there given and may be *D. lapidosus* itself, which is reported by Simon from Central and Eastern Asia. The eyes in my specimen are exactly as figured by Simon in fig. 319, which gives the arrangement for *D. lapidosus.* As the specimen was sent me among others I have no idea as to where it was found and when.

Locality. Palghat (June).

LEPTODRASSUS (Sim.), 1878.

11. *Leptodrassus* sp. ?

agrees with Simon's description (i. p. 363) and with his figure of the eyes for *Leptodrassus femineus* (i. p. 355). The teeth on the chelicera are two in number also. The only specimens I have got were all found within white woolly tufts of silk under the ledges of the old lighthouse in the High Court compound, Madras. These spiders associate very closely with certain Attids. For, if the white mass be touched, usually the Attids emerge first and jump off, while the Drassid remains within its hollow.

Locality. Madras city, all the year round.

Zodariidæ.

CRYPTOTHELE (C. L. Koch), 1872.

12. *Cryptothele ceylonica* (Camb.)

was found along with a Theridiid whose irregular web was over a few dried leaves, on which the Theridiid was resting beside her cocoon. *Cryptothele* was the exact colour of the withered leaves.

Locality. Nawalapitiya, Ceylon (March).

Hersiliidæ.

HERSILIA (Sav.), 1827.

13. *Hersilia savignyi* (Luc.).

The only member of this family I have come across is *Hersilia savignyi* (Luc.), which is common in Madras.

Simon (i. p. 445) states that *Hersilia* does not spin a web. Pocock (p. 240), however, is correct in saying Hersiliids spin at most a scanty web of irregular threads. I have seen *H. savignyi*, which is always found on tree-trunks, in the centre of a small circular web formed of very few threads with wide meshes.

H. savignyi is extremely variable in colour, and it usually, but by no means always, resembles very much in colour the tree-trunk on which it is resting. Frequently you do not notice the spider till it moves. It varies from fawn to almost black, and I have seen on the same trunk at the same time both shades, the one practically invisible and the other extraordinarily conspicuous.

Locality. Madras city, all the year round. Also from Carolina, Nilgiris, at 5600 feet. Not nearly so common on the hills as on the plains.

Pholcidæ.

The three well-known species described by Pocock (pp. 238–240) are common spiders. *Artema atlanta*, *Smeringopus elongatus*, and *Crossopriza lyoni* are all present in South India as ordinary house-spiders.

ARTEMA (Walck.), 1837.

14. *Artema atlanta* (Walck.)

has the well-known habit of swinging up and down very rapidly on its web when disturbed, probably to render itself less visible. Simon notes that the number of eggs is never considerable, but, though the usual number seems to be about 50, I have found close on 150.

Locality. Madras city.

SMERINGOPUS (Sim.), 1890.

15. *Smeringopus elongatus* (Vinson).

The female was found carrying as usual her cocoon in her mandibles. The cocoon contained 76 eggs. The pair were taken from the same web and lived together captives in the same bottle for over a week. I have seen this spider in the position depicted by Simon for *Mecolæsthus* (fig. 439).

Locality. Madras city (August); Nawalapitiya, Ceylon (April).

CROSSOPRIZA (Sim.), 1893.

16. *Crossopriza lyoni* (Black.).

Its web has sometimes a conical hollow, within which the spider rests inverted.

All the three Pholcids are common either within houses or outside in the open, where they shelter under rocks or under the ledges of buildings. They are not at all common on the hills.

Locality. Madras city (February–August).

Theridiidæ.

ARGYRODES (Sim.), 1864.

The genus *Argyrodes* includes species usually considered parasitic on the webs of other spiders. These spiders are not really parasitic, but are commensals living at the same table as that of the much bigger Argiopid and securing fragments of its food. *Argyrode sargentatus*, *A. fissifrons*, and *A. argyrodes* are found.

17. *Argyrodes argentatus* (Camb.)

are small silvery-backed spiders usually found on a few threads of their own at the back of the big web of an Argiopid. *Argyrodes* is most frequently got on the webs of *Argiope,* but also on those of *Gasteracantha, Tetragnatha, Araneus,* and *Cyrtophora.* The cocoon is very characteristic in shape and is always attached to withered stems some distance away from the big web.

Locality. Madras city : common on webs on the trees of the Beach during the monsoon (October–January).

18. *Argyrodes fissifrons* (O. P.-Cámb.).

Small red and white spiders with black legs, all from threads attached to the large web of *Nephila malabarensis.*

Locality. Nawalapitiya, Ceylon.

This species is said by Simon to be widespread in India and Malaysia, but I have seen it only in Ceylon.

Argyrodes argyrodes is also reported by Simon (i. p. 501) to be common on the web of *Cyrtophora citricola*, but as yet I have seen neither of these.

19. *Argyrodes nigra* (O. P.-Camb.) = *Theridion nigrum* (O. P.-Camb.) = *Theridion oxyurum* (Thor.).

A very small black spider with yellow legs, found without any web on the back of a convolvulus-leaf; very slow-moving, with the tips of the abdomen upturned; accompanied on the same leaf by many small black ants which it closely resembled.

Locality. Nawalapitiya, Ceylon.

Argyrodes nigra is not an *Argyrodes*, but a *Theridion*. It is not a commensal like the others, both sexes of which are found together on the same big web.

THERIDION (Walck.), 1805.

Theridion is a large genus represented by the following common species.

20. *Theridion mundulum* (C. L. Koch) = *T. amœnum* (Thor.).

A very pretty little spider which I have found common on the Nilgiris with its very irregular web, near the centre of which is a withered leaf, below or within which the spider shelters itself.

Locality. Kotagiri, Nilgiris (6000 feet); Madras Beach.

21. *Theridion rufipes* (Luc.)

is found indoors, sheltering in the corners of bath-rooms. The pair are got together within the same small irregular web.

Locality. Nawalapitiya, Ceylon; Kayencolam, Travancore.

22. *Theridion tepidariorum* (C. L. Koch).

Found within doors in corners of store-room, but also outside in the open.

Locality. Nawalapitiya, Ceylon; Kotagiri, Nilgiris; Madras city.

These three species (*T. mundulum*, *T. rufipes*, and *T. tepidariorum*) are noted by Simon as having almost a worldwide distribution throughout the Tropics.

ARIAMNES (Thor.), 1869.

23. *Ariamnes* sp.?

I possess two specimens of an *Ariamnes* from Madras. One is a male and 4 mm. long. It may be *A. gracillimus*

(Thor.), described by Thorell from Burma. It is a very small delicate spider found on the bushes. The second is a female, but does not at all agree in proportions with Simon's illustration of the female of *A. flagellum*, cf. i. p. 498. It is only 4 mm. long also.

Argiopidæ.

This huge family includes the numerous orb-weavers (Epeiridæ).

TETRAGNATHA (Latr.), 1804.

24. *Tetragnatha gracilis* (Stol.).

The small orb-web is said by Pocock to be always found over water, but this is not the case, for the spider and its web are often far from water, in such places as the wire-netting of the tennis court, doors of the bungalow, hedges, and bushes well away from water, as on the dry sandy beach of Madras. *T. gracilis* seems specially fond of making its web on the withered branches of spiky bushes. It is the smallest species mentioned by Pocock. The cocoon is a long, irregular, dark grey mass like a Rupert's drop in shape and is always attached to a withered branch. It is 30 mm. long and contained in the one examined 12 young spiders.

Locality. Madras city; Nilgiris at Kotagiri; Madras Beach.

25. *Tetragnatha geniculata* (Karsch)

makes its big web always at sundown: the biggest of the three species mentioned by Pocock. Found on the hills with big webs over running water.

Locality. Madras Beach; Pykara, Nilgiris.

26. *Tetragnatha hasselti*, var. *birmanica* (Thor.).

Found on the bushes on the Beach associated with *T. geniculata*.

27. *Tetragnatha mandibulata* (Walck.).

Found on a bush overhanging a well. ♀ laid 250 eggs within the test-tube the same night on which she was taken. Eggs within a central mass with diameter 6 mm. covered by light grey silk.

Locality. Madras city, Madras Beach; Coonoor, Nilgiris (5600 feet).

28. *Tetragnatha* sp.?

The commonest Tetragnathid I have discovered is one from Madras Beach. It greatly resembles *T. geniculata*, but the jaws differ. Each mandible has at its junction with the fang a large spine projecting straight in front.

The webs of *Tetragnatha* never have a stabilimentum.

EUCTA (Sim.), 1881.

29. *Eucta* sp.?

Associated with the Tetragnathids from the Madras Beach are found specimens of a *Eucta*, which builds its big orb-web at sundown also. It is easily recognized not by its shape and coloration, but by the slightly upturned long tip of the abdomen. This species is probably *Eucta caudicula* (Karsch) reported from India by Simon, who, however, also records *E. isidis* which is common to Egypt as well as to India.

The web of *Eucta* has no stabilimentum.

ORSINOME (Thor.), 1890.

30. *Orsinome marmorea* (Poc.).

This spider I have met only once on the hills, where I was lucky enough to secure both sexes together. Simon (i. p. 733) remarks that he has no notes regarding its habits. The spiders are big (15 mm. ♀, 10 mm. ♂) and were found with their large orb-webs slung between bushes horizontally over swiftly running water. Each spider was at the centre of the web hanging inverted and almost touching the quickly flowing current. There is no stabilimentum on the web, which is almost a yard wide. Both sexes were thus found at noon on a dull misty day. Gravely has found them on the Cochin Ghauts at 1500 feet. At the same spot I found closely associated *Tetragnatha geniculata, Araneus mitratus*, one *Argiope*, and *Cyclosa* sp. The big webs of *Orsinome* and of *Tetragnatha geniculata* were spun horizontally over the water a distance of one yard. *Orsinome* hung lowest next the stream, then *T. geniculata*. Above were the vertically placed webs of *A. mitratus* with the characteristic white stabilimentum, above these again the vertical webs of the *Argiope*, with those of *Cyclosa* at the top. All the webs depended from bushes growing at the water side.

In appearance the sexes of *Orsinome* greatly resemble each other in colour, the colours being much duller than in *Leucauge*. The ♂ *Orsinome* is almost as big as the ♀.

Locality. Pykara Falls, Nilgiris (6000 ft.).

LEUCAUGE (White), 1841.

Leucauge=*Argyroepeira* (Em.), 1884.

31. *Leucauge celebesiana* (Walck.).

Very common on its orb-web on almost any bush on the Nilgiris; web slung horizontally between the branches or bushes, the spider hanging inverted below the centre of the web.

Locality. Madras city; Nawalapitiya, Ceylon; Coonoor and Kotagiri, Nilgiris.

32. *Leucauge ditissima* (Thor.).

I have specimens resembling this species very much, but they have, when alive, on the abdomen three brilliant red dots which turn silvery after being kept in spirit. There is a pair of shoulder prominences.

Locality. Peradeniya, Ceylon; Kotagiri. This species I have not found on the plains.

33. *Leucauge argentata* (O. P.-Camb.).

Found on orb-web like that of *L. celebesiana.*

Locality. Madras city; Kotagiri, Nilgiris. Not previously reported from South India.

34. *Leucauge ventralis* (Thor.).

Spider with long fore-legs stretched out in front, ♂ and ♀ found resting on a twig of a tea-bush to which came a thread from the orb-web close by, stretched out below and between tea-bushes. The cephalothorax and legs in the living specimen are bright green.

Locality. Dolosbage, Ceylon; Carolina, Nilgiris (5600 feet); previously reported from Burma only.

35. *Leucauge* (*Callinethis*) *elegans* (Thor.) = *Argyroepeira fastigata* (Sim).

Found on large orb-web between tea-bushes. ♀ laid eggs in the specimen-tube the day after her capture. There were 890 eggs within the cocoon. This species is easily recognized by the last pair of legs having a characteristic bushy pad of hairs on the distal half of each tibia. The fleecy cocoon measures 14 mm. and 5 mm. at greatest axes. The silk is yellowish.

Locality. Dolosbage, Ceylon (3000 feet).

In no case has the web of a *Leucauge* any stabilimentum.

L. celebesiana is by far the commonest species.

36. I have also specimens of a small, beautifully silvery *Leucauge*. Both the ♂ and ♀ were taken together from the centre of a small orb-web on the eaves of an outhouse. The ♀ has the abdomen dorsally beautifully marked in silver with a median line of chocolate-brown marks. ♂ much more slender and not so silvery.

Locality. Dolosbage, Ceylon; Coonoor, Nilgiris. I have not met with this species on the plains.

NEPHILA (Leach), 1815.

37. *Nephila* (*Nephilengys*) *malabarensis* (Walck.).

Webs big and very irregular. Spider remains in a corner of the window in a tubular retreat of the web, resting here inverted during the day. Two varieties found, one much darker than the other in colour and very closely resembling *N. cruentatus* (Fabr.) from Johannesburg.

The compact egg-mass measures 19 × 11 × 19 mm. and is roughly egg-shaped. It shows very clearly through the loosely made outer wrapper of strong fibres. Total size of the fibrous cocoon is 30 × 16 mm. at greatest diameters. Number of eggs enclosed was 618, and the whole cocoon was attached to a withered leaf which had blown on to the web, which was on the outside of the bungalow window well up to the top of the glass panes.

Argyrodes fissifrons was found commensal on this web. These small red and white spiders with black legs greatly resemble the tiny males of *N. malabarensis* in size, shape, and colour, and probably benefit thereby. Many long, slender, black *Cyclosa* sp. were on their own webs close to the big one of *N. malabarensis*, while *Uloborus geniculatus* was also present on its own webs in the corners of the windows close to the big web.

Locality. Dolosbage and Peradeniya Gardens, Ceylon.

38. *Nephila maculata* (Fabr.).

Got on its large orb-web on the roof of the verandah. A large, very handsome spider, but not so strikingly coloured as *N. malabarensis*.

Locality. Dolosbage, Ceylon.

The webs of *Nephila* have no stabilimentum present.

HERENNIA (Thor.), 1877.

39. *Herennia ornatissima* (Dol.).

A single ♀ found at the centre of her web in bright sunshine on a tree-trunk. No stabilimentum.

Locality. Yercaud, Shevaroy Hills (4500 feet). I have not seen it elsewhere.

ARGIOPE (Sav.), 1827.

Argiope lobata (Pallas) has been reported from Bellary by Simon and *A. arcuata* (Sim.) from Bangalore by Staunton, but I have seen neither of these as yet.

40. *Argiope anasuja* (Thor.) (Pl. III. figs. 3, 4; Pl. IV. fig. 5) is by far the commonest species round Madras and in South India generally. The web, often suspended between adjoining branches, is a large orb-shaped one with a very characteristic stabilimentum in the form of four white zigzag lines making a St. Andrew's cross. The cross is not always complete, sometimes only one of the four lines being present. This stabilimentum usually begins with the top left part of the × or the whole left stroke of the ×, then the top of the right stroke may be added, but the finished product is the regular × with the four parts all present. These white lines lie as continuations of the directions in which the spider holds its legs, *cf.* Pocock, p. 221, and serve as distinct supports to the spider.

The cocoon measures between 4 and 5 cm. in length. It is long, irregular, resembling a curled up withered leaf, cylindrical, tapering to each end, but swollen in the centre by the compact mass of yellow eggs enclosed. It is grey-green and when opened a single egg-case contained 840 eggs, another 186 young spiders.

The specimen shown in the photos was picked off by a mynah (*Acridotheres tristis*), corresponding to our starling, the torn web, cocoon, and the small commensal *Argyrodes* all being left. In this instance the circular part of the web was 10 inches in diameter and the white cross (stabilimentum) 2·5 inches along each stroke of the ×.

A. anasuja is the smallest species mentioned by Pocock (p. 226). He gives no good way of distinguishing readily between the species *A. pulchella*, *A. undulata*, *A. anasuja*, and *A. taprobanica*, which are all closely allied forms. As several varieties of each species are known, a fact already pointed out by Gravely, and as Pocock in his key deals only with the ♀, the various species will be much more easily determined once the ♂ are described systematically.

The ♂ *A. anasuja* is fairly common during the cold weather along with the ♀ on the bushes of Madras Beach. It is very much smaller than the ♀ and of a plain brown-purple. I have noticed on the bushes (1) the tiny ♂ on the same big web as the ♀ but at the respectful distance from her, (2) the ♂ on a small web of his own either in front of or behind and parallel to the big web, (3) two ♂ on the same web as the ♀, (4) ♂ on same web as ♀ but immediately behind her. The male measures 4 mm. and the female 12 mm. Simon (i. p. 765) gives the size of the male as one-fifth that of the ♀.

The small immature ♀ are often found, each on a small web of her own which has no stabilimentum proper, but sometimes the central part of the web is marked by a white lacework of stronger threads in the centre, against which the spider rests.

The mature ♀ is always found upon the stabilimentum at the centre of the vertical web head downwards. When alarmed she always raises her body outwards from the web, and then suddenly pops through the hole at the centre of the web behind her to the other side.

Locality. Madras city and Beach; Chingleput. Seen but seldom on the Nilgiris at Kotagiri.

The small commensals *Argyrodes argentatus* common on the big webs of the ♀ sometimes come close up to and touch the big *Argiope*'s leg, which she quickly moves away. She does not attack the small silvery intruder, which probably has very limited vision.

41. *Argiope taprobanica* (Thor.).

Very like *A. anasuja* in colour and appearance, and has the same type of stabilimentum. Its cocoon, however, is light green and triangular in outline, enclosing the compact central mass of eggs. Each side of the cocoon measures about 4·5 cm. Probably the distinctive shape of the cocoon may be helpful as here in distinguishing the species and so in other cases.

Locality. Nawalapitiya, Ceylon.

42. *Argiope æmula* (Walck.).

Easily recognized because its abdomen is not pentagonal in outline.

Locality. Nawalapitiya, Ceylon.

Pocock in 'Marvels of the Universe' (Hutchinson & Co.) calls *Argiope* by the trivial name of the X-ray spider. He considers that the white ribbons of the stabilimentum conceal the spider's limbs from flies and also from marauding wasps. To my mind they serve only as a background which shows up the spider's limbs. The white may attract flies, but the ribbons are essentially a central support for the body of the spider, which remains on it throughout the day full in the sun's rays.

CYRTOPHORA (Sim.), 1864.

43. *Cyrtophora* (*Araneus*) *cicatrosa* (Stol.). (Pl. IV. fig. 6.)

Spider found within a wonderfully fine web, which is roughly conical but may have several stages below the dome. This web commonly hangs under bushes of *Opuntia* or *Yucca*. *Cyrtophora cicatrosa* itself is beautifully coloured, dainty, and hangs downwards at the apex of the inverted bowl of the web. The cocoons are suspended vertically above the dome and external to it, all in line. They are whitish, but show up green in spirit. Gravely reports having found these spiders in communities with their webs, but I have got them always quite apart, each spider within its own web. The commensal *Argyrodes argentatus* is present occasionally.

The cocoon is 5 mm. long, bead-shaped, oval in outline with the inner coat very strong. I have found 20 young within the cocoon. The spider keeps adding to the number of cocoons, which therefore varies greatly. In the photo there were at first 3, then 7, and I have seen as many as 12 all in line.

The diameter of the base of the dome is usually about 6 inches. Ceylon specimens are much darker in their markings than the Madras ones ; the colour of their cocoon is also deeper in shade.

Locality. Madras, Ennur, Pallavaram ; Dolosbage, Ceylon ; Kayencolam, Travancore.

This spider is not reported from Ceylon by Pocock. He classes *Cyrtophora* with *Araneus*, considering that no very important or constant character separates the two genera. I agree with Simon (i. p. 773) that being so very different in the form of their webs, which recall those of *Linyphia*, that it is therefore convenient to keep the two separate. The genus *Araneus*, in the limited sense, contains already some 800 described species.

Cyrtophora citricola (Forsk.).

This, the type-species, is very widely distributed. It has been reported from Chingleput by Jambunathan, but I have not met with it as yet.

44. *Cyrtophora* sp.

I have also a very small *Cyrtophora* about 4 mm. long, the only one I have seen on the hills. Both sexes are very similar in size, shape, and colour, abdomen blackish with small white dots at sides; but unfortunately the two males obtained are immature, thus rendering identification impossible. Both ♂ and ♀ make the same type of web as *C. cicatrosa*, but the ♂ web is less perfect. Spider rests under the top sheet of the web inverted as in the case of *C. cicatrosa*. No cocoons got.

Locality. Carolina Estate, Coonoor, Nilgiris (April).

CYCLOSA (Menge), 1866.

45. *Cyclosa insulana* (Costa) = *Epeira trituberculata* (Lucas)
Epeira anseripes (Walck.)
Cyclosa propinqua (Sim.)

is the commonest form both on the hills and on the plains. It is most variable in colour and in shape also. As regards the web, Simon (i. p. 782) remarks that the stabilimentum varies according to the species and that *C. insulana* and nearly related forms have the white lines arranged like that of *C. conica* (Pallas) as a band interrupted at the centre, while *C. bifida* (Dol.) has the stabilimentum in the form of several very irregular concentric circles, or more correctly ellipses.

At Kotagiri, on the Nilgiris, *Cyclosæ* are very common, and I carefully collected from the webs, noting specially the form of the white stabilimentum. I find that the shape is not by any means constant for the species. *C. insulana* has most often the stabilimentum as a diameter, but also as elliptical lines, as a radius, a very small irregular white mass at the centre of the orb-web, or again no stabilimentum of any kind.

Though this species is by far the most common, I have no record of its cocoons.

Locality. Madras city, Madras Beach, Pallavaram; Kotagiri and Coonoor, Nilgiris; Dolosbage, Ceylon.

46. *Cyclosa bifida* (Dol.).

I have several long, slender, almost entirely black specimens which are either this species or a closely allied one.

These are common on the Nilgiris and also upcountry in Ceylon. The Nilgiri forms had the stabilimentum as a single white line as diameter or none, while the Ceylon ones always had none.

Locality. Kotagiri, Nilgiris; Dolosbage, Ceylon.

47. *Cyclosa hybophora* (Thor.)

is recognized by the two very distinct tubercles on the shoulders of the abdomen. The cocoons here are about 4 mm. long. There were four of them, each containing about fifty eggs. These cocoons are attached to the stabilimentum, which, in this case, was a white line placed as a radius to the circle of the orb-web.

Locality. Madras Beach, Ennur; Kotagiri, Nilgiris.

A white *Cyclosa* (Pl. V. fig. 7) which I obtained in Ceylon has these two shoulder prominences and is probably merely a variety of this species. It had the white ribbon of the stabilimentum as diameter with nine cocoons arranged along it. These were about 5 mm. long and recalled in shape those of *Cyrtophora*. They contained about thirty eggs in each.

Locality. Dolosbage, Ceylon.

48. *Cyclosa mulmeinensis* (Thor.).

I have several examples of a beautiful little *Cyclosa* which seems to be this species. All were found on orb-webs with the stabilimentum as a radius only. The cocoons are yellow-brown covered with black debris, and as many as five are found within one outer case which is from 10 to 15 mm. long. Each cocoon contains some forty eggs. Each cocoon-case lies along the stabilimentum.

The males and immature females have small separate orb-webs of their own, apart from the others. In such cases each spider is found at the centre of the web and there is no stabilimentum. In one case the ♀ was at the centre of her web resting on a whitish mass of threads (stabilimentum), to which a single yellow-brown cocoon was attached. These cocoons are evidently formed singly and then united into one mass later on. In the case above examined, where there were five cocoons within the mass, the first two contained spiderlings almost ready to leave the cocoon, the third very immature spiderlings and the last two eggs only.

Locality. Ootacamund, Nilgiris (September).

From the Nilgiris I have several species or varieties which as yet I have been unable to identify. Some are distinctly brown in colour, others have a pale tip to the long abdomen, while others again, mostly black, have the curious habit on the web of keeping the slender tip of the abdomen upturned over the body dorsally.

Where the stabilimentum is present, it always soon gets dirty with remains of victims. The spider on it is very often unrecognizable, even when closely looked for—it matches in colour the white band so well. This was particularly the case with the Ceylon *Cyclosa* above mentioned.

From Pykara Falls, Nilgiris, I found several forms with webs on the bushes near running water. There were no stabilimenta and the spider was silvery on the abdomen dorsally and had the tip of the abdomen upturned. The shape is not nearly so slender as in the case of the long narrow Ceylon forms (*C. bifida*?).

ARANEUS (Clerck), 1757 = *Epeïra* (Walck.), 1805.

49. *Araneus laglazei* (Sim.).

A small spider, 6 mm. long, resembling a bird's dropping on a leaf. Found on a twig near the orb-web, which is about 9 inches diam. and had very wide meshes, but no stabilimentum. Spider is dark grey, almost black, with the abdomen whitish dorsally.

Locality. Madras city (previously reported from Ootacamund); Kotagiri, Coonoor, Pykara, Nilgiris. Common in and around Ootacamund (September).

50. *Araneus théisii* (Walck.).

Found resting by day under a withered bracken leaf, which it greatly resembled in colour, on the golf course at Kotagiri. Found on Madras Beach on a leaf of *Abutilon*. A very inert spider, very like *A. nauticus*, but smaller and the sternum is all dark, almost black. The dorsal pattern of the abdomen is very pretty, almost constant, and probably characteristic. Found near orb-web in evening resting on a grass-stem.

Locality. Madras Beach; Kotagiri and Ootacamund, Nilgiris.

51. *Araneus nauticus* (Koch, L. K.) = *A. pullata* (Thor.).
(Pl. V. fig. 8.)

Lies hid during the day within a withered leaf. Found in the train from Talaimanaar to Colombo. At dusk it emerged and made its web in the compartment. When touched it retired into a crevice on the roof.

Locality. Kotagiri. Dolosbage, Ceylon.

52. *Araneus rumpfi* (Thor.) = *A. decens* (Thor.) = *A. hispida* (Dol.) = *A. rufofemorata* (Sim.)

is the commonest species, and greatly resembles *A. nauticus* in colour and markings. It is very common on *Calotropis gigantea* on Madras Beach. The cocoon is very loosely woven and flocculent in appearance, no stout outer covering being present. The eggs enclosed within one cocoon examined numbered 1464. These cocoons are very common on the golf course at Kotagiri and also on the banks at the road-sides attached to twigs.

This species is very fond of making its web against the wall of the house at dusk, then taking up its position in the centre of the web with its back to the wall. During the day it rests in one corner, to which a strand of the web leads. It is very inert when gently handled. If smartly touched this spider drops at once to the ground on its own thread, and if not further molested, after a short time, it climbs up again to the old position.

At the centre of the web, over which the spider places itself, there is sometimes a small white mass of thickened thread, which cannot be considered as being of the nature of a stabilimentum.

A. rumpfi is extremely variable in colour and markings on the dorsal surface of the abdomen.

Locality. Madras city ; Hillgrove, Coonoor and Kotagiri on the Nilgiris.

53. *Araneus bilunifer* ? (Poc.).

With two small very conspicuous white circular spots on the front part of the abdomen dorsally. This species resembles *A. rumpfi* in its vulva and scape, and has the same habits as *A. rumpfi* and *A. nauticus*, being found with its web under the eaves of the verandah. It rests in the corner of the verandah during the day. The presence of the two conspicuous spots alone connects it with Pocock's species *bilunifer*, for it differs from his description in having no shoulder processes on the abdomen, in the prevailing colour not being yellowish but dark grey, in the nature of the vulva, and in its size, for it is only 11 mm. long and quite adult.

Locality. "Carolina," Coonoor, Nilgiris.

54. *Araneus mitratus* (Sim.).

♀ resembles a small *Cyrtophora citricola* at first sight, but the posterior extremity is not bifid, and there is only a single pair of shoulder prominences on the abdomen. The vulva has a particularly long, fine, slender scape.

♀ found all on orb-webs, which have a very faint stabilimentum arranged as one diagonal or one stroke of the × of *Argiope*'s web, the stroke from right to left. All were found resting at the centre of the webs at 11 A.M. These webs were all on the banks at the road-sides and were all in the shade. The spiders keep always behind the web and the bank. The white stabilimentum may be found arranged vertically ; webs found over running water between bushes.

♂ found at 5 P.M. on a small perfect orb-web of his own. The web-strands completely crossed over the hill-path, a distance of some 5 feet. Spider was at the centre of the web, which had no stabilimentum. Is this the spider whose threads catch your face so frequently in the dark as you pass along the path ?

Sometimes the webs have no stabilimentum. They are always above the ground, often as much as 5 feet, suspended between the branches of bushes and of trees.

Locality. Coonoor, Karteri, Kodanad, Kotagiri, Pykara, and Ootacamund, all on the Nilgiris.

55. *Araneus mitifica* (Sim.).

A beautiful green spider with the abdomen dorsally grey, marked prettily with characteristic black spots. Found always on the leaf of a hedge with the orb-web near by. The spider rests on the leaf under a light silk tunnel, and then rushes out when a victim alights on the orb-web, which, if damaged, is repaired every now and then. Found on *Lantana* frequently and other bushes. Interesting, as thus having the same habits as *A. melanocrania.*

Locality. Madras city ; Kotagiri.

56. *Araneus* (*Zilla*) *melanocrania* (Thor.).

Web is a small orb, but the spider never takes up its position on the web, but always within a curled up leaf close by. The small cocoon is fixed near the leaf, within which the spider rests, or may be sometimes actually within the leaf beside the spider herself.

The cocoon is 6 mm. at greatest diameter. The one I opened contained 125 eggs, besides young spiders. There is no stout outer covering to the cocoon, which consists simply of fine yellow threads lightly woven together.

The small size of the spider, its blackish head, reddish thoracic parts and legs, and the dorsally whitish porcellanous abdomen make the species easily recognisable.

Locality. Madras city, very common on bushes on the Beach.

57. *Araneus*, sp. nov.?

Small spider only 3 mm. long, very like *A. laglazei* in appearance, but with the abdomen terminating dorsally in a very distinct, black, smooth, blunt point. Found at the centre of the small orb-web.

Locality. Chingleput; Madras city.

58. *Araneus*, sp. nov.?

Very pretty orb-weavers found commonly on the Nilgiris with the web always over running water. The spider is always at the centre of the web in the evening, when the web is made. The spiders are quite small, 3 mm. long, and are beautifully marked. The basal colour is a green-grey. The cephalothorax has dark bands down the centre dorsally and round the margins. The abdomen dorsally is darker down the mid-dorsal line and again at the sides, while below it is black with two distinct straight white lines a little to each side of the mid-ventral axis. These two lines run from each side of the vulva to the mamillæ and enclose a black area. The sternum is black and the grey-green legs banded with black. In spirit the lighter dorsal parts of the abdomen appear silvery. Vulva without scape. They greatly resemble young *Orsinome*.

Locality. Throughout the Nilgiris.

59. *Araneus,* sp. nov.?

Found on a lichen-covered wall, small, only 3 mm. long. Shoulder prominences huge in proportion to the other parts. Vulva without scape.

Locality. Madras city.

60. *Araneus*, sp. nov.?

Common as a house-spider within the bungalow, lodging especially on the wooden roof. The cocoons are of the usual white flocculent type, and are very conspicuous against the dark teak beams. Each cocoon measures 5 mm. in diameter, and is roughly globular. The cocoon contains 50 eggs.

The spider is 5 mm. long with the cephalothorax reddish yellow, red-brown round the eyes ; legs similar, but banded with dark brown ; abdomen dorsally dark grey, ventrally lighter in front around the genital opening ; sternum pale fawn and so also are the coxæ. The vulva is covered by a triangular hard yellow chitinous plate (epigyne), the two central thick parts being brown ; scape absent.

Locality. Madras city.

Pocock's key to the species selected by him (*cf.* p. 224) is based entirely on the characters of the ♀, no ♂ being mentioned in his account. A proper key will not be forthcoming until the ♂ have all been found and described. Below I give a brief description of two of the males, viz. those of *A. rumpfi*, the commonest species of South India, and of *A. mitratus*, which I got on the Nilgiris.

Description of A. rumpfi, ♂.

Colours much as in the ♀, carapace brown with yellowish hairs ; legs brownish with darker annulations ; sternum light yellow ; abdomen dorsally varied with light and dark grey marks to form a median light band with a darker band on each side tapering at the tip behind ; front and sides of abdomen light yellow or grey ; abdomen ventrally pale yellow with darker spots at the centre and at the spinnerets. Only the coxæ of the first legs have the small red-brown apophyses, which are incurved. The tibiæ of the second pair of legs are armed with small spines as usual.

The male is not so much smaller than the female (10–15 mm.), for it measures 8 mm., the carapace being as long as the abdomen.

Description of A. mitratus, ♂.

It greatly resembles the female in general form and colour, but is smaller (♀ 7 mm. long, ♂ 3 mm.). Both have a conspicuous white St. Andrew's cross at the front end of the abdomen dorsally between the shoulder points, and on the ventral side of the abdomen there is a median rectangular black area bordered by lighter lines and ending in a pair of light spots on each side just in front of the spinnerets. The male examined was immature.

GASTERACANTHA (Sund.), 1833.

61. *Gasteracantha brevispina* (Dol.).

A very pretty, dainty, small spider on a large web at its centre without any stabilimentum. The young are only

1·5 mm. at greatest width across the abdomen. The colour is almost black, and on the abdomen dorsally there are very distinct white spots forming a St. George's cross. The colour-scheme greatly resembles that in the male of *G. geminata*, and the young are found on very small simple orb-webs about 3 inches diam. without any stabilimenta or white dots.

Locality. Madras city ; Dolosbage, Ceylon.

62. *Gasteracantha geminata* (Fabr.).

Larger and much more common than the above. The web is made against the wall of the bungalow or else out in the open between the branches of trees. Often the web is found well under the shade of trees, and as it is swung on very long threads it moves very easily in the breeze and is therefore very difficult to photograph successfully. The main lines of the web are flecked out with little white dots and dashes, which are quite characteristic. The spider remains always at the centre of the web during the day. The web of *G. brevispina* is much smaller and finer, and has no white marks anywhere upon it. Both species spin their webs in the mornings before 7 o'clock.

The ♂ *G. geminata* seem to rest on single threads only at some distance from the large web of the ♀. The commensal *Argyrodes argentatus* is quite common on the big web of the ♀ in Madras city during February. One point of interest is that the ♂ of *G. geminata* has not the same number of sigillæ as depicted by Simon in fig. 887. He shows three small on each side, but there are really four. I have also found the ♂ on small complete orb-webs of their own, quite apart from the big one of the ♀, the diameter of their webs being only about 3″.

Locality. Madras city and Beach. Dolosbage, Ceylon.

POLTYS (C. L. Koch), 1843.

63. *Poltys illepidus* (C. L. Koch).

Nocturnal spider, caught by chance in the dark. So far as I know it has no web. In the twilight I saw it dimly outlined among creepers and seized it, thinking it was a fruit. It was lying among withered branches and leaves on the top of the tennis netting, where it probably rests during the day.

Locality. Madras city. Previously reported only from Ceylon.

CHORIZOPES (Camb.), 1870.

64. *Chorizopes frontalis* (Camb.).

These minute spiders, only 2 mm. long, were got all from single threads along with the ♂ *Gasteracantha geminata* from bushes. Both *Chorizopes* and *Gasteracantha* ♂ greatly resemble each other, but the ♂ *Gasteracantha* is twice the size of *Chorizopes* and has of course its own distinctive features. Simon reports (i. p. 922) never having noticed the web, which is usually a small perfect orb about 2″ diam. All rest in the centre of the webs, which, like those of *Gasteracantha*, are all made in the mornings.

Locality. Madras city.

Clubionidæ.

ŒDIGNATHA (Thor.), 1881.

65. *Œdignatha retusa* (Sim.). (Pl. VI. fig. 9.)

Very dark little spider, dug out from its burrow in the hill-side. The mouth of the burrow has no web leading to it, but has the entrance curiously formed of twigs, leaves, straws, etc., filled round the central circular opening to form a small turret. A small cocoon containing a very few eggs was found within the tunnel. This complex type of dwelling is quite unusual among the Clubionids, and resembles very much what I found on the Nilgiris, where on the banks at the road-sides there was a similar opening (Pl. VI. fig. 10) (to the burrow of a Mygalomorphid), which was of course much larger in size, measuring 10 mm. in diameter. Dwelling described by Simon (ii. p. 189).

Locality. Dolosbage, Ceylon (May).

SELENOPS (Latr.), 1819.

66. *Selenops radiatus* (Latr.).

Found within kitchen; very flat spider; nocturnal.

Locality. Kotagiri, Nilgiris.

67. *Selenops* sp.?

Found under the bark of trees associating with the small scorpion *Isometrus thurstoni*, which it greatly resembles in colour and markings.

Locality. Yercaud, Shevaroy Hills.

SPARASSUS (Walck.), 1805.

68. *Sparassus lamarcki* (Latr.)

is the commonest species; found often within the bungalow at night. Abdomen is marked dorsally by a median line of small black dots and ventrally by a broad black median stripe. The mandibles have also at the top of each to the outside a characteristically red-brown spot. Outside in the open the spider during the day retires under the shade of a leaf.

I have found the female with her cocoon attached to a withered leaf of *Calotropis gigantea* on Madras Beach. The globular mass of spiderlings measured 14 mm. in diameter, and was fastened to the leaf under a stout tubular outer cover, which protected the spider as well. There were 340 young spiders within the cocoon.

Locality. Madras city.

69. *Sparassus tarandus* (Sim.).

There are a large number of Sparassids on *Calotropis* that are much smaller than *S. lamarcki* (♀ 10 mm., ♂ 7 mm.). These live within a curled up leaf, within which the simple globular cocoon is placed. The cocoon measures 6 mm. in diameter and contained 115 young. Often found within a withered leaf containing the cocoon.

Locality. Madras city and Beach.

HETEROPODA (Latr.), 1804.

70. *Heteropoda venatoria* (Linn.)

is the common species and is often met with in houses after dark. The cocoon is drab-white and measures 19 × 16 mm., being roughly oval in outline; in thickness at greatest depth it is 8 mm. The cocoon resembles a flat button, in section doubly convex. It contained 275 young ones.

Locality. Madras city; Kotagiri, Nilgiris.

THELCTICOPIS (Karsch.), 1884.

71. *Thelcticopis paripes*? (Karsch).

A single male alone obtained. It agrees with Pocock's description in having the branches of the tibial apophysis unequal, but here the outer branch is long, curved, and sharp, while the inner is short and blunt. Possibly Pocock may have erred in his account.

Locality. Koyencolam, Travancore. Previously reported from Ceylon.

Agelenidæ.

Agelena (Walck.), 1805.

72. *Agelena inda?* (Pl. VI. fig. 11.)

From the nature of the web this is seemingly a colonial spider. The web is always on a bush—hill guava (*Rhodomyrtus*), *Dodonea viscosa,* box, rose, privet, and very commonly on whin,—and has a distinct platform upon which victims alight. The spider itself lies hid in the densest central part of the web-mass, often within a curled up withered leaf, the inside of which is lined by the silk of the web. The cocoon is beautifully made and is attached to the walls of the central chamber of the web by 9 or 10 radiating points. The cocoon is a dead-white and can often be seen through the thin silk of the web, especially when the web is not covered with debris. Sometimes three cocoons are found all covered over with the debris of victims, *cf.* beetles, bugs, and flies.

Simon reports only one species of *Agelena* from India, cf. *Agelena inda*, which may be this one. The cocoon is so very unlike the typical one for the family as to be quite peculiar and interesting. It measures 15 mm. at greatest width and contained 52 young spiders. It has a very dense white outer covering. Simon (ii. p. 254) refers to the female depositing her cocoon, which is flat and formed of two concave discs, within the chamber which I have described above as the cocoon itself. I have examined several of these cocoons, and have found inside the mass of spiderlings enclosed within a single sheet of very thin tissue only. The web-mass consists of several leaves fastened together. Quite recently when in Coorg I found the cocoon within the cocoon-chamber as described above by Simon.

Since Agelenids are very rare in the Tropics, this is probably accounted for by the fact that they are found only on the hills above 3500 feet. Small Blattids and earwigs often live in the web-mass, which may harbour two spiders.

Locality. Kotagiri, Coonoor and Ootacamund, all on the Nilgiris. The spider is very common on whin-bushes in and around Ootacamund at 7200 feet (April–October). Not found on the plains.

TEGENARIA (Latr.), 1804.

73. *Tegenaria domestica* (Clerck).

This common British species is now worldwide in distribution. I found one male on the window curtain of the dining-room of the bungalow one afternoon.

Locality. Kandaloya, Ceylon. Not commonly found in the Tropics.

Pisauridæ.

EUPROSTHENOPS (Poc.), 1897.

74. *Euprosthenops ellioti* (O. P.-Camb.).

From the web stretched between prickly-pear (*Opuntia*) bushes not far from the side of the River Adyar. The spider lived for several days inside a tube which had some formalin in it. The peculiar arrangement of the anterior lateral eyes, giving the old name Podophthalma to the group, makes identification simple. Web is large and very irregular, the spider resting inverted below it, cf. *Psechrus.*

Locality. Madras city, banks of the Adyar. Already reported from Chingleput by Jambunathan. The spider is said to be found on bushes only near water.

THALASSIUS (Sim.), 1885.

75. *Thalassius phipsoni* (?) (F. Camb.).

Found running across bedroom floor at 10 P.M. Spider is therefore nocturnal, characterised by two very distinct, lateral, bright yellow lines passing right down the cephalothorax and abdomen dorsally. Rest of the surface olive.

Locality. Madras city.

Lycosidæ.

HIPPASA (Sim.), 1885.

76. *Hippasa agelenoides* (Sim.).

Seems to be the common small Lycosid found on its peculiar web among the grass of the compound and at the road-sides. It is a small banded spider, from 7 to 11 mm. long, and is fond of making its web with a distinct tunnel. Very often it is got resting within the tunnel awaiting a victim to alight on the sheet-like expansion of the web. The tunnel is open at both ends. The mother carries her cocoon behind attached to the spinnerets, as in all Lycosids. The cocoon measures 5 mm. in diameter and is globular. I have found it containing 130 spiderlings.

Locality. Madras city.

77. *Hippasa pantherina* (Poc.)

is equally common and has the same habits. It is a larger spider reaching 16 mm. Both species greatly resemble each other, and both have the sternum marked by a median black longitudinal line. Here the cocoon measures 8 mm. in diameter and I have found it with 308 spiderlings.

Locality. Pallavaram ; Dolosbage, Ceylon ; Kotagiri, Nilgiris.

LYCOSA (Latr.), 1804.

78. *Lycosa indagatrix* (Walck.)

is the largest form. It is found living in tunnels or burrows in the ground, measuring 20 mm. diameter and about 200 mm. deep. This tube is not lined with silk, but the open upper end has a circlet of dead leaves around it and entering it. There may be a lining of silk round the upper part of the tube next the mouth. The leaves greatly help to conceal the opening. Sometimes one leaf acts as a kind of lid to the tube. The tube is always open, but the spiders are purely nocturnal and have to be dug out during the daytime. The young ones seem to lie concealed under the shelter of stones and do not make small burrows.

Locality. Madras city, Ennur.

79. *Lycosa catula* (Sim.).

A cryptozoic spider found lurking under dead leaves lying in the dry bed of a hill-stream.

Locality. Shevaroy Hills, Yercaud.

80. *Lycosa chaperi* (Sim.).

A small form brought home from the Madras Christian College.

Locality. Madras city.

Oxyopidæ.

PEUCETIA (Thor.), 1870.

81. *Peucetia graminea* (Poc.).

Found on the top of the fruit of *Abutilon* (Malvaceæ) and also on the withered leaf of *Jatropha* (Euphorbiaceæ) which had attached to it the empty cocoon measuring about 10 mm. in diameter.

Locality. Madras city and beach ; Kotagiri, Nilgiris.

82. *Peucetia viridana* (Stol.) = *P. nigropunctata* (Sim.).

Found on a green leaf eating a caterpillar, on the large white flower of *Datura*, on *Jatropha*, and on the fruit of *Abutilon indicum.* The cocoon was on the *Abutilon* fruit, the eggs being covered by a compact tissue of silk, through which they are easily seen. Number of eggs present was fifty and the diameter of the egg-mass 10 mm., for it is circular in outline. Cocoon also found attached to the leaf of *Cleome viscosa* and guarded by the mother. It is white, spherical, diameter 7 mm., and the outer covering is produced into numerous white, projecting, little blunt points which give it a very characteristic appearance.

Locality. Madras city, Pallavaram.

Pocock, p. 255, designates the family as "hunting spiders, spinning no web, living amongst grass and other plants and fastening their cocoons to the leaves or stalks." This description is quite good, but he omits the interesting fact that they all can jump readily, like the next family, the Attids, and are therefore somewhat difficult to catch.

Simon (ii. p. 375) says that the *Peucetia* appear to affect glandular plants. They do so here and seem specially fond of *Jatropha glandulifera,* a very sticky plant, plentiful in the scrub-jungle around Madras city. I have also noticed them on *Cleome viscosa,* which is a common weed by the road-sides and on the Beach.

OXYOPES (Latr.), 1804.

83. *Oxyopes rufisternis* (Poc.).

Commonly found running on hedges of *Clerodendron*, etc., throughout the year.

Locality. Madras city ; Dolosbage, Ceylon (May).

84. *Oxyopes hindostanicus* (Poc.).

The cocoon is placed on a withered leaf suspended on horizontal threads between two branches. The mother protects the cocoon, covering it with her body, and will not desert it even when touched. The spider greatly resembles birds' droppings on the leaf, the legs being held close up to the sides of the body. This species is the commonest in

Madras. The cocoon on or within a withered leaf measures 10 mm. and contains 50–60 eggs. Common on *Calotropis* along the Beach. *Oxyopes hindostanicus* I have found eating the comparatively large moth *Utetheisa pulchella* (Linn.).

Locality. Madras city ; Kotagiri, where they are common among dead leaves on the ground ; Coonoor.

85. *Oxyopes birmanicus* (Thor.).

Found like *O. rufisternis* running on the hedge in the compound. The cocoon is placed within a withered curled up leaf. It is irregular in form and was found to contain in one case 40 spiderlings, in another instance the circular mass of eggs measured 8 mm. diameter and contained 104 eggs.

Locality. Madras city.

86. *Oxyopes wroughtoni* (Poc.).

Reported from Balsar. It greatly resembles *O. birmanicus* in colour.

LITERATURE CONSULTED.

1857. DOLESCHALL, C. L. Tweede Bijdrage Tot de kennis der Arachniden van der Indischen Archipel. Batavia.

1882. CAMBRIDGE, O. PICKARD-. "Catalogue of Collection of Ceylon Spiders," Journal of the Linnean Society (Zoology), vol. x.

1887. THORELL, T. Viaggio di L. Fea in Birmania e Regioni vicine.

*1892. SIMON, E. Histoire Naturelle des Araignées, vol. i. Paris.

*1895. THORELL, T. Descriptive Catalogue of the Spiders of Burma. London.

*1897. SIMON, E. Histoire Naturelle des Araignées, vol. ii. Paris.

1898. SIMON, E. Matériaux pour servir à la Faune Arachnologique de l'Asie méridionale," Mémoires de la Société Zoologique de France pour l'Année 1897, pp. 252–262.

1899. POCOCK, R. I. "Diagnoses of some New Indian Arachnida," Journal Bombay Natural History Society, xii. pp. 744–753.

*1900. POCOCK, R. I. The Fauna of British India — Arachnida. London.

1900. POCOCK, R. I. "Descriptions of some New Species of Spiders from British India," Journal Bombay Natural History Society, xiii. pp. 478–498.

1901. SIMON, E. "Arachnida of the Skeat Expedition to the Malay Peninsula, 1899–1900," Proceedings of the Zoological Society of London, 1901, vol. ii.

1905. JAMBUNATHAN, N. S. "Habits and Life-history of a Social Spider (*Stegodyphus sarasinorum*, Karsch)," Smithsonian Miscellaneous Collections, vol. 47.

1915. GRAVELY, F. H. "Notes on the Habits of Indian Insects, Myriapods and Arachnids," Records of the Indian Museum, Calcutta.

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* These works are constantly referred to throughout this paper and are indispensable.

EXPLANATION OF THE PLATES.

Plate II.

Fig. 1. *Psechrus torvus* inverted below web, which here crosses a dry mountain torrent. × $\frac{1}{10}$.
Fig. 2. *Psechrus torvus* web edge on, to show the tubular retreat denied by Simon, also its slightly arched nature.

Plate III.

Fig. 3. *Argiope anasuja*; young resting on lacework stabilimentum. × 1.
Fig. 4. *Argiope anasuja*; web with full × stabilimentum on *Opuntia*. × $\frac{1}{4}$.

Plate IV.

Fig. 5. *Argiope anasuja*; stabilimentum with only one stroke of ×, spider rolling up a fly. × $\frac{1}{2}$.
Fig. 6. *Cyrtophora cicatrosa* within domed web. × $\frac{1}{2}$.

Plate V.

Fig. 7. *Cyclosa* sp.? (Ceylon) with stabilimentum as diameter (broken) bearing spider and cocoons. Web against aloe-leaf.
Fig. 8. *Araneus nauticus* resting by day on bark of a cypress-tree. × $\frac{1}{2}$.

Plate VI.

Fig. 9. *Œdignatha retusa*; turret at mouth of burrow. × 1.
Fig. 10. Nilgiri Barychelid; turret at mouth of burrow. × $\frac{1}{3}$.
Fig. 11. *Agelena inda*; web on aloe-bush, showing cocoon-case within.

[All the Plates are from photographs taken by the Author.]

XXV.—*Brief Descriptions of new Thysanoptera.*—X.[*]

By Richard S. Bagnall, F.L.S.

Suborder TEREBRANTIA.

Family Æolothripidæ.

Æolothrips fulvicollis, sp. n.

♀.—This species very closely resembles the common holarctic species *A. fasciatus*, L. The following differences are evident in the material at my disposal :—

The pronotum, instead of being of the same colour as the head and body, is much lighter, being of a yellow to yellowish-brown colour. The fore-legs are only present in

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[*] Continued from Ann. & Mag. Nat. Hist. ser. 9, vol. i. p. 221 (1918).